# EXECUTIVE SUMMARY

## Soil Testing for Various Heavy Metals in and around Some Schools of El Paso Independent School District (EPISD)

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## Summary of Results

Heavy metal concentrations in soil, federal and state guidelines for metals in soil, and locations of samples are presented in the next several tables and figures. Results were collected from Douglas, Zavala, and Beall Elementary Schools, and Bowie High School, in addition to some nearby locations.

**Table 1: Concentration of certain heavy metals at schools and various other locations in El Paso, measured by digestion and chemical analyses by ICP-MS.**

| Location | Lead (Pb) ppm | Arsenic (As) ppm | Zinc (Zn) ppm | Copper (Cu) ppm |
|---|---|---|---|---|
| **Douglas Elementary School** | | | | |
| D1 | 64 | 6 | 87 | |
| D2 | 135 | 8 | 107 | |
| D3 | 218 | 12 | 292 | |
| D4 | 97 | 8 | 107 | |
| D5 | 99 | 7 | 124 | |
| # 1: Eucalyptus and Cypress St (across the street from Douglas Elementary) | 134 | 8 | 190 | 367 |
| # 3: Salazar Housing Complex – Playground (next to metal recycling) | 126 | 8 | 217 | 1110 |
| | | | | |
| **Zavala Elementary School** | | | | |
| Z1 | 16 | 2 | 0 | |
| Z2 | 40 | 5 | 75 | |
| Z3 | 156 | 7 | 202 | |
| # 2: Behind Zavala Elementary School (Perra & Latta St) | 74 | 6 | 96 | 44.8 |
| # 5: Front of Zavala Elementary School (Main Entrance Parking Lot) | 94 | 5 | 166 | 76.2 |
| | | | | |
| **Bowie High School** | | | | |
| BH1 | 57 | 3 | 100 | |
| BH2 | 13 | 3 | 3 | |
| BH3 | 23 | 3 | 54 | |
| # 4: Chamizal (Near Weather Station) | 58 | 5 | 71 | 33.6 |
| | | | | |
| **Tierra es Vida Community Garden** | 39 | 5 | 35 | 16.6 |

**Table 2: Concentration of certain heavy metals at Beall elementary school and nearby locations, as measured by the p-XRF instrument (before it malfunctioned). All values in parts per million (ppm), BD indicates 'Below Detection'**

| No. | Pb (Lead) ppm | As (Arsenic) ppm | Zn (Zinc) ppm | Cu (Copper) ppm |
|---|---|---|---|---|
| 1 (Front of Beall Elementary School – Piedras Street) | 57 | BD | 133 | 38 |
| 2 (Across the street from the school – Rivera Avenue) | 37 | BD | 144 | 62 |
| 3 | BD | BD | 12 | BD |
| 4 | BD | BD | 14 | BD |
| 9 | BD | BD | 24 | BD |
| 10 | BD | BD | 23 | BD |

**Table 3. Federal/State Guidelines for Heavy Metal Levels in Soils**

| | Lead (ppm) | Arsenic (ppm) | Zinc[c] (ppm) | Copper[d] (ppm) |
|---|---|---|---|---|
| **Guidance Value Protective of Public Health**[a] | 400 | 16 | 2200 | 270 |
| **NYC Urban Background Level**[a] | 48 - 690 | 4.1 - 26 | 64 - 380 | 23 - 110 |
| **Bare soil in Children's play areas**[b] | 400 | | | |
| **Bare soil in Children's non-play areas**[b] | 1200 | | | |

[a] Healthy Soils, Healthy Communities –Metals in Urban Garden Soils
http://cwmi.css.cornell.edu/Metals_Urban_Garden_Soils.pdf

[b] Hazard Standards for Lead in Paint, Dust, and Soil (TSCA Section 403)
https://www.epa.gov/lead/hazard-standards-lead-paint-dust-and-soil-tsca-section-403

[c, d] Can be toxic to plants at levels below guidance values protective of public health

**Note:**
Based on the guidelines above and the concentration levels of the various heavy metals, it can be said that copper concentration levels are very high in two locations – Salazar Housing Complex playground and the area across the street from Douglass Elementary School (Eucalyptus and Cypress Street). This is a cause of major public health concern as young children spend considerable amount of time playing in the Salazar playground. This playground is located adjoining the copper recycling plant. These results suggest a disproportionately high copper exposure burden for children living in this residential complex.

## Douglas Elementary School

The following are the five location points from where soil core samples were retrieved at Douglas Elementary School


**Figure 1: Google Earth Image of the five locations points at Douglas Elementary School**

## Zavala Elementary School

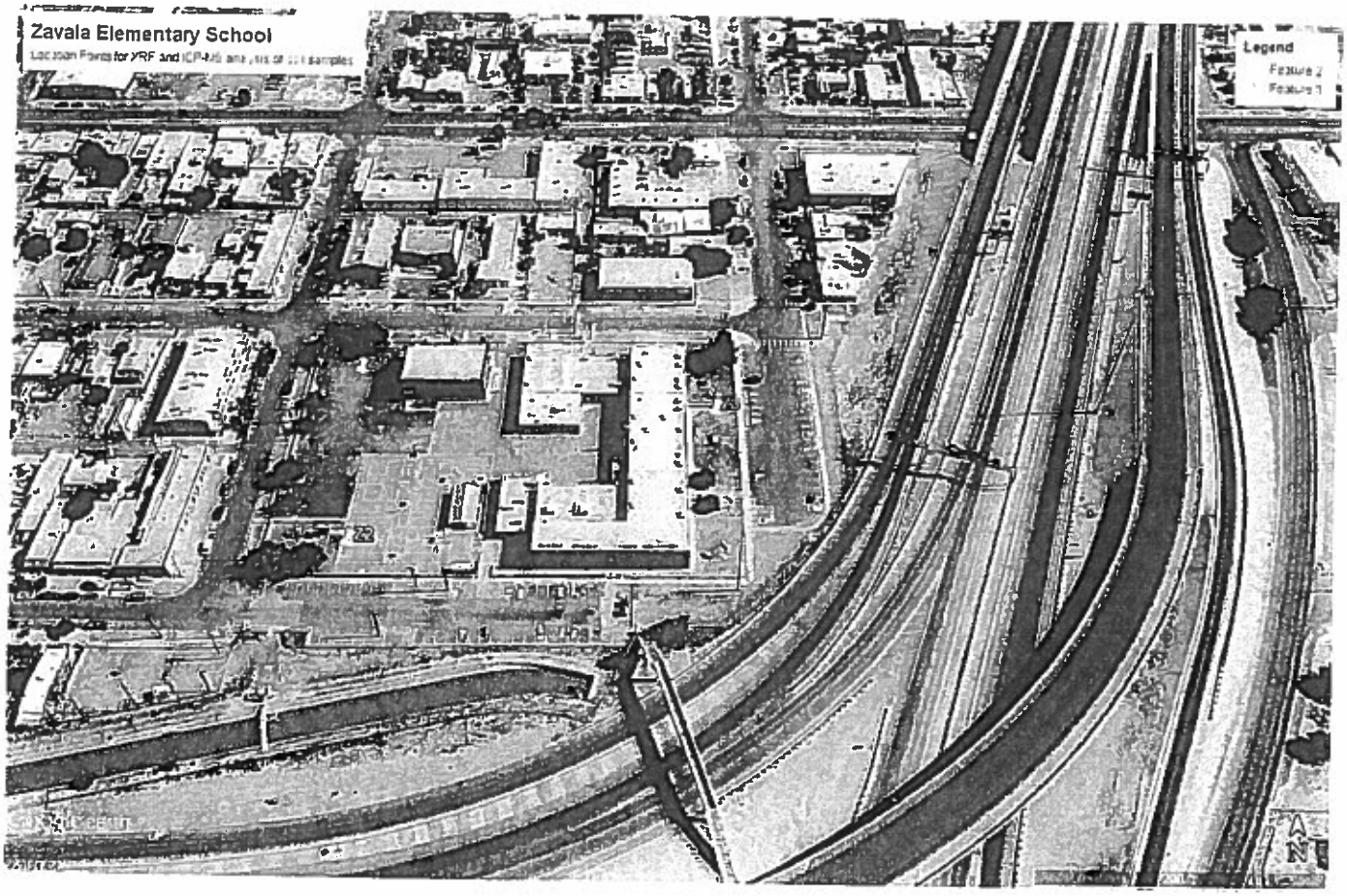


**Figure 3: Google Earth Image of the three location points for the soil samples collected at Zavala Elementary School.**

## Bowie High School

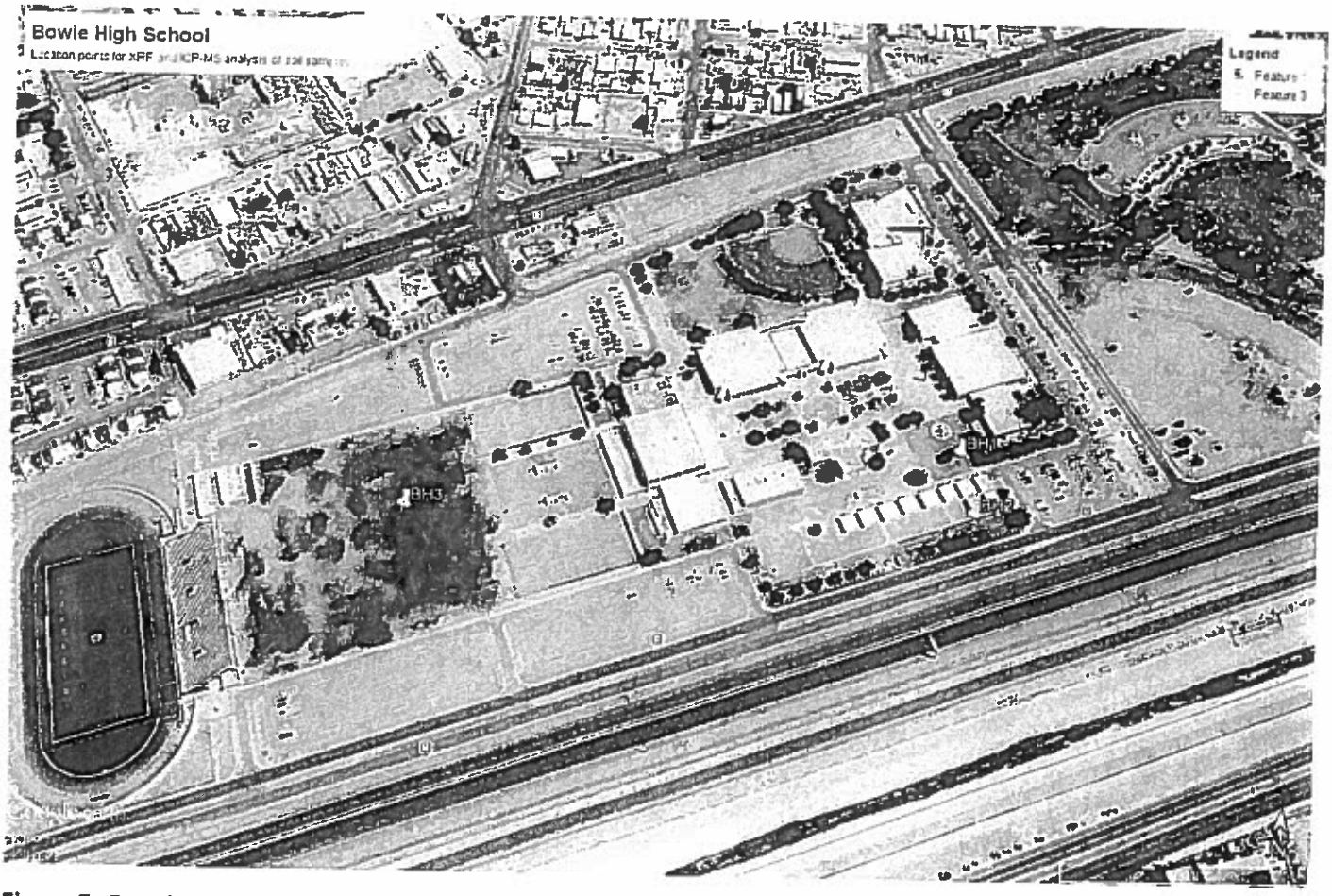


**Figure 5: Google Earth Image of the three location points for the soil samples collected at Bowie High School. Both XRF and ICP-MS analysis were conducted on these soil samples.**

## SUMMARY

1. With respect to lowering the risk to children from environmental exposure of lead in soil, the current official EPA guideline is 400 ppm total lead. However, EPA is considering lowering this value to 150 ppm since results have shown that much lower levels can put children at risk, depending on the bioavailability of the lead. Therefore, we would consider values greater than 400 ppm as high risk and values between 150 and 400 ppm as moderate to high risk, depending on lead bioavailability. The CDC has lowered critical blood levels for lead from 10µg/dL to 5µg/dL, but actually consider any level as "not safe" for children.

2. Using these criteria, no sample that we collected at Beall, Douglas, Zavala, or Bowie schools met the high risk category for lead (>400 ppm). Two samples met the criteria for moderate risk; one at Douglas Elementary playground (218 ppm) and one at Zavala Elementary school (156 ppm). One other sample at Douglas Elementary (135 ppm), one sample across the street from the school (134 ppm), and one sample from the Salazar Housing Complex playground (126 ppm) were close to 150 ppm ranging from 126-135 ppm.

3. All the samples collected from Beall, Bowie, and Zavala schools, with the exception of the one sample in front of Zavala school, could be considered low enough to be low to moderate risk depending on the bioavailability of the lead, ranging in total concentration from 13-99 ppm lead.

4. In terms of other heavy metal elements, no excessive levels of arsenic, zinc, or copper were found with the exception of one sample from the Salazar Housing Complex. The sample from the children's playground was very high in total copper (1110 ppm). Neither EPA nor Texas has guidelines for copper, but the state of New York uses 270 ppm as a guideline for children's exposure. Clearly this one sample for the playground at Salazar exceeds this amount.

## RECOMMENDATIONS

1. At Zavala school, the one area that had a high concentration of soil lead was in front of the school in a playground designated for the kindergarten and pre-kindergarten children. The concentration of 156 ppm would be considered a moderate risk for children and perhaps even a high risk for younger children who are more vulnerable. We recommend that this playground area be moved to an area with lower lead concentrations and to reduce the risk to the youngest and most vulnerable children.

2. The Douglas Elementary playground contains lead levels with low to moderate risk, but depending on the bioavailability of the lead (not measured) could be moderate to high risk. We recommend that EPISD consider some remedial action at this site. The simplest and most cost effective action could be simply hauling in soil with a much lower lead level and covering the playground with 1-2 inches of fresh soil.

3. The Salazar Housing Complex playground is very close to the metal recycling facility and has very high soil copper concentrations. We recommend that this playground be moved to a site at greater distance from the metal recycling plant. The current playground should be covered with fresh soil or paved over.

bioavailability (high bioavailability bad, low bioavailability good)
- only way to get lead in blood is breathing or swallowing it.
- Often 10-20% of lead can actually get into the blood stream
- Need to know how soluble